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STATE OF NEW YORK.

No. 76.

IN SENATE,

March 24, 1870.

REPORT

OF THE COMMISSIONERS OF THE CENTRAL PARK, IN COMPLIANCE WITH THE PROVISIONS OF "AN ACT FOR THE IMPROVEMENT OF CERTAIN PARTS OF WESTCHESTER COUNTY, HARLEM RIVER AND SPUYTEN DUYVIL CREEK," PASSED MAY 11, 1869.

To the Honorable the Legislature of the State of New York:

The Board of Commissioners of the Central Park, in compliance with the provisions of an act entitled "An act for the improvement of certain parts of Westchester county, Harlem river and Spuyten Duyvil creek," passed May 11th, 1869, which requires them to report to your honorable body at its present session, the maps, plans and profiles, specified in the law, "so far as they shall have been able to complete the same, with such field notes and explanatory remarks, as the nature of the subject may require, with a statement of all their proceedings under this act," respectfully

REPORT:

That two days after the passage of the act mentioned, directions were given by the Board for obtaining the necessary surveys and information to enable it to comply with the provisions of the law; also measures were taken to obtain such portions of the moneys

needed for the purposes of the act, as it seemed probable would be likely to be required by the Board in executing the provisions of the law, before the present session of the Legislature should terminate.

Arrangements were immediately made for obtaining the surveys and maps needed for the intelligent and proper performance of the duties assigned to the Board, in all those parts of the towns of West Farms and Yonkers, most contiguous to the city of New York, and most intimately connected with the plan of improvements of that portion of the city of New York which has been intrusted to this Board by your honorable body.

The comprehensive nature of the works referred to the Board for consideration and report, embracing as they do plans and profiles for laying out and discontinuing streets, avenues, roads, public squares and places, with their widths, courses, windings, and grades; the sewerage and drainage of the land; the supply of pure and wholesome water for the district; the improvement of the Harlem river and Spuyten Duyvil creek, and the plan and location of all bridges, tunnels or other means of transit across or under such river and creek, absolutely requires, for the present and for the future, that the surveys and maps should be on an extensive scale and made in the most accurate manner, and so as to show in detail, all the topographical information needed for the determination of each and all the separate questions referred to the Board, and at the same time to satisfactorily indicate the intimate relation which exists between the several subjects under consideration.

Such surveys and maps are necessarily expensive, and require much time for their execution, and with all the dispatch that could be secured, the Board has but quite recently, been able to procure the returns of these surveys from about one-fifth of the district in which surveys are now in progress, which district does not cover but about three-fifths of the whole district embraced in the law.

Work that has thus far been done or that is under contract to be done on these surveys, is upon credit, as up to the date of this report the Board has not received one dollar from any of the authorities of Westchester county.

A map is herewith presented, upon which is shown by color, the district referred to the Board for its consideration and report, and also the adjacent part of Westchester county and the city of New York; a shaded line drawn across it indicates the limits of the detailed surveys already completed, in progress or contracted for.

Since a portion of the surveys were complete the time for their examination and study has been brief, too brief to allow the Board to make many specific recommendations.

The streets and roads, the laying out of which the Board has already determined to recommend, are indicated by red lines, and the bridges or tunnels for affording means of transit across or under the Harlem river and Spnyten Duyvil creek are also shown by red lines and are hereafter specifically mentioned.

Although the Board is at present unprepared to submit to your honorable body any specific plan for the whole improvements required by the law under which they are proceeding, sufficient information has been obtained to show that it will be a much more difficult task properly to provide for the future wants of the district under consideration, than it would have been if the survey and preparation of plans for the territory east of the New York, Harlem and Albany railroad had been included. This territory and that west of the railroad belong to one natural drainage field and forms one of the largest natural valleys in the southern part of Westchester, which must hereafter be one of the main outlets of travel as well as of sewerage and drainage.

Without the means or the power to obtain the topographical information of the extent of drainage and rain fall east of the railroad, it will be impossible to devise satisfactorily the needed means of sewerage and drainage.

Without the means or power to obtain information in regard to the future plan for laying out streets or roads, east of the railroad, or to devise a plan for the same, it will be equally impossible to recommend any satisfactory permanent plan for the future laying out of streets and roads, immediately west of the railroad. A line of demarcation has been fixed by the law on the eastern boundary of the territory referred to the Board for report, which is not a natural one, but altogether artificial, and as the Board does not desire to incur expenditures that are not for the basis of useful and necessary improvements, it has deemed it best to make these suggestions to your honorable body.

The consideration of the supply of pure and wholesome water for the district which is also confined to the property west of the railroad, is equally necessary for that east of it; the geographical formation of the whole of the lower part of Westchester and the surrounding country is such, that the only sources of supply of water which

are available with economy for the western section are the only ones available for the eastern, and the means for utilizing such sources should, as a matter of economy, be adapted to both sections.

Investigations have been commenced for ascertaining the most feasible plan for obtaining a supply of water, and the correspondence had with General George S. Greene, engineer of the Croton aqueduct, on this subject, is given in an appendix, from which it will be seen that he estimates, that in connection with the present water-shed of the Croton river, the available sources of supply in Westchester county may be assumed as sufficient for the supply of four millions of inhabitants. It would obviously be improper to seize the whole means of water supply for the whole district, and appropriate it to a part of it. No such arrangement could be of long duration. The Board has also been somewhat embarrassed by the fact that there are and have been several separate and independent commissions appointed by acts of the Legislature, and who are engaged in laying out streets and roads, and determining grades for them in the district committed to the care of the Commissioners of the park, and there is, doubtless, great danger that a harmonious plan for the whole district will be marred by independent plans for laying out streets, and for fixing their grades for the mere temporary advantage of separate localities, without reference to the necessities of the whole area.

The progress made by two separate commissions in laying out certain streets and roads under laws first passed in 1868, was such that the Board has felt it a duty to give a qualified concurrence in the routes indicated for them.

The second section of the law under which the Board is acting in Westchester county, shows so directly that it was the intention of the framers of the law, that a bridge or carriage way should be located by this Board over or across the bridge over the Harlem river, known as the high bridge, that an early opportunity was taken for the consideration of the questions involved therein, and to determine whether the high bridge of the Croton aqueduct was competent to sustain a carriage way above the present structure, without liability of injury, or possible interruption thereby of the supply of Croton water to the city of New York; the opinion of the engineer-in-chief of the Croton aqueduct was requested on this question, and the correspondence on this subject, and his opinion adverse to the plan, is appended hereto.

The Board is, as the question now stands, unwilling to recommend the construction of a bridge or carriage way, above and resting on the

high bridge, at any rate till an opportunity for public investigation is had.

In this condition of the subject, examinations have been made to ascertain where and how a bridge could be built in the vicinity of the high bridge, which would connect the high grounds of Westchester with the high grounds of New York city, as was evidently the object of a carriage way over the high bridge of the aqueduct. A suitable location for a suspension bridge at a greater altitude than the high bridge can be found at a point about two thousand feet north of the high bridge, with favorable points on both shores for towers and anchorages; and the Board would recommend that authority be given for such a construction at or near the point indicated.

By an act of the Legislature passed May 19th, 1868, Commissioners were appointed for laying out, opening and closing of streets, roads and avenues in the town of Morrisania, in the county of Westchester, and by the fourth section of the act first mentioned, it is provided that "The Commissioners of the Central Park shall not in any manner interfere with or perform any of the duties imposed upon the Commissioners appointed by the act of May 19th, 1868, except with the consent of or in conjunction with the said Commissioners."

By the act of May 11th, 1869, this Board is required to prepare and submit plans for the improvement of the Harlem river in front of the town of Morrisania, as well as for bridges, tunnels or other means of transit across or under it, but the laying out of streets or roads which must form the approaches to all bridges or tunnels in the town of Morrisania, is vested in the Morrisania commission who have not yet completed their work, and consequently this Board has not yet been able to devise any complete system of crossings. Information has, however, been obtained, to warrant this Board indefinitely recommending the construction of a bridge or tunnel as soon as possible across the Harlem river, from the end of the seventh avenue in the city of New York, to near the present terminus of Central avenue, on the Westchester shore, as the present central bridge near that point is reported to be in a decayed condition, and also that another bridge or tunnel should be built across the same river near the southerly side of Sherman's creek, and a third at the northerly termination of the new line of the King's bridge road.

The determination of the question whether bridges with swings or draws, or tunnels under the river, should be recommended and adopted, can only be arrived at after full surveys and borings at each

place shall have been completed, and estimates made of the comparative cost and advantages of each plan; and the Board has been unwilling to incur the expense of such surveys and estimates, until the actual location for them shall have been settled, by the adoption of streets terminating opposite each other, on both sides of the river; at or near the places before mentioned.

The want of knowledge by the Board of what plan will be adopted for the laying out of streets in the town of Morrisania, and the time required for obtaining the surveys on other parts of the Harlem river and Spuyten Duyvil creek, prevents the recommendation, at present, of any definite plan for the improvement of the river and creek, by the introduction of canals or wet basins or otherwise; but the belief is that basins and canals may be introduced with great advantage to future business and prosperity on both sides of the river.

It is probable that the laying out of streets and avenues, and the fixing of proper grades for them in the town of West Farms will be, to a great extent controlled by the plan which may be adopted by the commission for laying out streets in the town of Morrisania, and until that commission can indicate the probable lines of travel which they will lay out in a northerly and southerly direction, this Board will be unable to locate definitely many needed roads in the town of West Farms. It appears certain, however, that an avenue at a moderate elevation above the Harlem river, extending from and under the high bridge of the Croton aqueduct, nearly parallel to the river, to, or near to, King's bridge, will be required in order that communication may be had between the northerly and southerly ends of the district, without the necessity of traveling up and down steep hills, as at present.

The present necessity for better means of communication between New York and Westchester counties, the rapidly increasing demand for them, and the knowledge that considerable time must be consumed in their construction, induces the Board to definitely recommend to your honorable body that authority be given, as soon as practicable, for the construction of the various works hereinbefore specifically mentioned, namely:

A bridge or tunnel to connect the Seventh avenue in the city of New York with Central avenue in Westchester county, the line of the extreme southerly end of which latter avenue should be somewhat modified for this purpose.

A suspension bridge across the Harlem river at a point about two

thousand feet north of high bridge, to connect the elevated lands of both counties.

A bridge or tunnel across or under the river near the south side of Sherman's creek, and a bridge or tunnel across the river at the northerly line laid out for the King's bridge road.

An avenue extending from the north line of Morrisania at the high bridge to or near to King's bridge.

An avenue extending from the proposed bridge near Sherman's creek up the hill towards Fordham, and another from the proposed suspension bridge in an easterly direction, to connect with Central avenue and extend so much further as future examinations may show to be desirable.

It also appears to the Board desirable that authority be delegated to the proper officers, to raise and pay over from time to time, as required, the necessary funds for surveys and constructions, instead of leaving the Board to the necessity of performing such works on credit.

The Board is strongly impressed with the importance of confiding to one authority the devising of a plan for the whole natural drainage district, and as little work as possible should be performed in making improvements by separate Commissioners, until some general plan for the development of the whole territory can be definitely arranged for; until that is done there can be no certainty that separate plans and constructions will result favorably to the general interests.

The Board is also of opinion that it would be desirable to include in the plan for laying out streets and roads, and fixing their grades and sewerage and drainage, and for supply of pure water, all that part of the towns of Westchester and West Farms lying east of the New York, Albany and Harlem railroad, as well as the parts west of such road already referred to this Board, because the material interests of both sections are identical, their relative distances from the center of commercial business on this continent are the same, and their geographical formation so similar as to require unity of plan for the whole.

In the appendix of this report will also be found a copy of the specification contained in the contracts for surveys and a copy of one of the sheets of surveys returned under the terms of the contract, is also herewith submitted.

Dated New York, March 1st, 1870.

HENRY G. STEBBINS,

President Board of C. C. P.

AND. H. GREEN,

Comptroller of the Park.

APPENDIX.

To ANDREW H. GREEN, Esq.,

Comptroller of the Central Park.

SIR.—At the request of the Commissioners of the Central Park, I have considered the available sources for supplying the inhabitants of the lower part of Westchester county with water.

These sources are the water-shed of the Croton river and its tributaries, and the water-sheds of the Sawmill, Bronck's, and Byrom rivers, above or north of the latitude of Yonkers village.

The area of the Croton water-shed contained $338\frac{7}{8}$ square miles.

The aggregate area of the water-sheds of the streams which are deemed available is estimated at eighty square miles.

We have definite data from which we can get a very near approximation of the quantity of water furnished by the Croton, from measurements of the height of the overflow taken daily at the Croton dam. We have calculated the quantity running waste, which is in addition to the quantity sent to the city through the aqueduct.

We have calculated this quantity running waste, during a very dry season, for twelve months, ending 1st July, 1864. This quantity was 10,087,000,000 cubic feet. At the same time the quantity carried to the city daily was estimated at 7,000,000 cubic feet, and for the twelve months, 2,555,000,000 cubic feet, making the quantity furnished by the Croton water-shed or the Croton dam, 12,642,000,000 cubic feet.

The Croton water-shed has been carefully surveyed and available sites for fifteen storage reservoirs determined, having an aggregate surface area of 6,500 acres and a capacity for storing 8,303,000,000 cubic feet of water, nearly double what will be necessary for utilizing the whole flow of the Croton in dry seasons.

The loss by evaporation for a year for these relative quantities of area and capacity will be about one and four-tenths per cent of the quantity stored.

On the supposition that we shall desire to use daily 32,500,000 cubic feet, an ample supply for 4,125,000 people (at eight cubic feet or $59\frac{4}{5}$ gallons daily for each person), the quantity required yearly will be 11,862,500,000 cubic feet. By an examination of the daily overflow we find that there will be 4,221,500,000 cubic feet to be stored in order to equalize the delivery daily of 32,500,000 cubic feet per day. The loss by evaporation on this quantity stored will be 60,000,000 cubic feet for twelve months, which will leave a margin of 719,500,000 cubic feet per year, or nearly 2,000,000 daily to provide for wastage from other causes.

From this investigation I believe that the Croton water-shed will furnish the ample quantity of sixty gallons daily to at least 4,000,000 of people.

Our gaugings show that we have brought into the city daily a maximum quantity of 71,000,000 gallons.

Before enlarging the aqueduct we shall probably use machinery to increase the velocity and thereby the capacity to a very large extent, but the aqueduct will require to be made stronger to a large extent before that can be done.

The waters of Byrom river can be carried to the valley of the Broncks without difficulty. The valley of Sawmill is separated by a high ridge from Tibbetts' brook. Pumping will be required to deliver the waters of the Sawmill at the high ridge between the Sawmill and Tibbetts' rivers, whence they could be distributed by gravity.

If the water-sheds of the Sawmill, Broncks and Byrom river, should furnish water in the same proportion as the Croton water-sheds, there would be obtained from these sources a supply for 959,409 people.

The nearness of these last mentioned water-sheds will greatly reduce the cost of bringing the water supply to the inhabitants.

Whatever use is made of the last described sources, storage reservoirs will undoubtedly be required, and their position and the economy of constructing them, and the number, size and location of the conduits can only be determined by a careful survey of the whole region.

The population of the metropolis spreads in all directions; the region north of the city will, in all probability, when properly drained and supplied with water, be a favorable direction for that movement. Still, with all this prospective increase on the island and in Westchester, I believe that the sources indicated will furnish an ample supply for this portion of the metropolitan population with the prospective increase.

Most respectfully your obedient servant.

(Signed)

GEO. S. GREENE,

Consulting Engineer.

July 16th, 1869.

DEAR SIR.—With this I send a copy of an act entitled "An act for the improvement of certain parks of Westchester county, Harlem river, and Spuyten Duyvel creek," being chapter 826, of the Laws of 1869.

By section one you will observe it is made the duty of the Board of Commissioners of the Central Park to devise and prepare plans and locations of all bridges across the Harlem river; and by section two, it is provided that, "in case the said Board shall locate a bridge or carriageway over or across the bridge over the Harlem river, known as the high bridge, and if, upon their report to the Legislature, it

shall be confirmed by the Legislature, it shall be the duty of the Croton Aqueduct Board, and they are hereby requested to construct such bridge or carriage-way without unnecessary delay."

From the language of this act, it seems clear that the Legislature intended that a bridge for carriage and foot travel should be devised and erected by the Commissioners of the Central Park, over and upon the high bridge, if in their opinion it can be done with benefit to the property affected, and to the public interest.

This paramount necessity of preserving in unquestioned and unquestionable safety, the high bridge, the only present means of conveying water into the city, induces me, as a matter of precaution, before proceeding any further in this matter, to ask you, as the chief engineer of the Croton aqueduct department, whether in your opinion the high bridge can be used to sustain a properly devised bridge or carriage-way from the New York to the Westchester shore of the Harlem river, without endangering the supply of water, and with safety to the travel.

From an examination of the topography of the Harlem river, for a considerable distance above and below the high bridge, it appears very desirable that a communication should be established between New York and Westchester, at or near the location of the present bridge, and at a great elevation above the river, in order that the foot and carriage travel to and from the elevated lands of both counties may be accommodated; and if the present structure for conveying the Croton water across the river is sufficient to afford the support required for a bridge for carriage travel, very great expense will be saved by so using it; and it could be brought to use in a comparatively short period for the purpose, without diminishing the appearance of the bridge.

The park laid out by the Commissioners of the Central Park, at the New York end of the bridge, will afford a space for ample approaches on this side, and there are no difficulties of approach on the other side which are not readily surmounted.

The Commissioners of the Central Park hesitate to locate a bridge dependent on the high bridge for its support, if, in your opinion, as chief engineer in charge of it, such course would be likely to jeopardize its stability.

Your opinion, in writing, on the point in question is respectfully asked, as early as you can give it, in order that if it is adverse to the use of the present bridge for the purpose indicated, other plans may be devised; or, if it should be favorable to such use, that time sufficient may be left to report location and plans to the Legislature at its next session.

Very respectfully.

(Signed)

ANDW. H. GREEN,
Comptroller, C. P.

Genl. GEO. S. GREENE,
Chief Engineer, Croton Aqueduct Board.

CROTON AQUEDUCT DEPARTMENT,
OFFICE OF THE CHIEF ENGINEER, 18th Dec., 1869. }

ANDREW H. GREEN, Esq.,

Comptroller of the Central Park :

DEAR SIR.—I herewith send you a report on the capacity of the high bridge of the Croton aqueduct, to support the additional structure of an iron bridge. I have the report of the water supply for the lower part of Westchester county in a state of forwardness, and will present it in a few days.

GEO. S. GREEN,

Chief Engineer Croton Aqueduct Department.

To the Commissioners of the Central Park :

GENTLEMEN.—I have considered the subject of the construction of a carriageway or viaduct on the aqueduct bridge across Harlem river, usually known as high bridge, as requested in your communication.

Wm. S. Dearborn, Esq., an engineer in this department, well qualified for the duty, has examined the detailed plans of the bridge, and calculated the weight of the bridge supported by the piles of the foundation, and the strain on the stone work of the arches and piers. His report is herewith presented. The result of this investigation is, that the piles of the foundation (supposing that they are driven to the rock or hard gravel, as we believe they are), will without any risk support the proposed additional viaduct and the travel over it, and that the arches are sufficiently strong to support the same weight and motion. But, that the side walls have not the requisite strength for the support of such additional structure and travel without danger to the bridge, and that such strengthening of the walls as would make the bridge safe with such additional weight and the motion of travel, would interfere with the future enlargement of the aqueduct, which the wants of the city may demand. All the water brought to the city must be carried over this bridge.

I do not therefore think that a viaduct or carriage-bridge could with propriety be built over the high bridge, but that the structure should be used only for aqueduct purposes and for foot travel.

Respectfully.

(Signed)

GEO. S. GREENE,

*Chief Engineer and Commissioner of the
Croton Aqueduct Department.*

ENGINEER'S OFFICE,
HIGH SERVICE WATER WORKS, }
November 21st, 1869. }

DEAR SIR.—Agreeably to your instructions, I have examined the high bridge of the Croton aqueduct, with reference to its strength to support an iron road bridge, and herewith submit the result :

The following data was used in making the examination. The crushing weight of the voussoirs of the bridge was assumed at 10,320 lbs. per square inch, this being the mean of the Quincy and the Patapsco granite. The weight of a cubic foot of the granite at 166 lbs., brick, at $112\frac{2}{3}$ lbs., concrete, at 150 lbs.

The weight of an iron road bridge was assumed at 3,000 lbs. per lineal foot. Load in the iron bridge; this was taken at one person weighing 150 lbs., to each 18 inches square over the entire floor, and this was doubled as an approximate allowance for these persons being in motion. The tons used are 2,000 lbs. each. The length of the arch considered to support the surcharge is three feet eight inches at each end, this being the thickness of the side walls at the crown of the arch, they forming the support of the iron bridge above the arch. The weight borne by the piles in the foundation of the piers of London bridge, built by G. Rennie, civil engineer, in 1824, is $90\frac{2}{3}$ tons each, and those in Southwark bridge, built by Mr. Rennie, senior, in 1814, bear $71\frac{3}{8}$ tons each. The section of the high bridge selected for examination was pier No. 11, and one-half of the two arches springing from it of 80 feet span each, being 94 feet in length of the bridge.

The total weight of this section of high bridge, including masonry, iron pipes, and the water in them, and the iron road bridge, and its load is $7,731\frac{4}{5}$ tons. This would be supported by 306 piles 12x12, supposed to be driven to the rock or other firm bottom, each pile bearing $37\frac{5}{8}$ tons, being a little more than half the weight borne by the piles of Southwark bridge.

The maximum thrust of the arch and the effect of the total surcharge is $37\frac{2}{3}$ tons per square foot at the key. The ultimate strength of the stone is $743\frac{1}{8}$ tons per square foot, or $19\frac{7}{8}$ times the pressure on the stone. These results show that the arch foundations of the high bridge, are sufficiently strong to bear the proposed structure in addition to the bridge as it now stands.

The unreliable features of the bridge considered in reference to its power to bear the proposed iron bridge, are the side walls upon which the latter will have to rest. These walls are composed of granite and brick, and are three feet eight inches thick at the crown of the arch, three feet six inches thick on top, and sixteen feet in height above the top of the arch, and form the sides of an almost square tube, connected only at the top by a brick arch one foot thick, which forms the top of the bridge, and at the bottom by the floor of the bridge. If the iron bridge was to have a continuous bearing on the top of these walls, as it has been supposed to have in the calculations for the thrust of the arch, I think, in time, the walls and brick arch would be fractured by the vibrations of the iron structure. In case the iron bridge was to be supported only at points situated directly over the piers' pilasters, the wall and pilasters here have a thickness of five feet six inches, for seven feet nine inches in width at top, and a thickness of six feet two inches for nine feet in width, at the level of the spandrel blacking. The walls here have a height of thirty-nine feet. These tie stones are one for each area of twenty-

four square feet, and they are insecurely tied to the longitudinal walls inside the bridge by single stone, stretching from wall to wall. An iron bridge supported at the last named points, would, I think, be more secure than if supported continuously on the top of the walls; but even these points of support have certainly no excess of strength, if they have enough, to support the iron structure safely.

Very respectfully, your obedient servant.

W. L. DEARBORN.

Engineer in charge S. W. W.

GENERAL GEORGE S. GREENE,

Ch. En. Cro. Ag. B., N. Y.

NOTE.—The side walls between the floor of the bridge and the top of the roof, sixteen feet in height, are composed of a stone wall, two feet eight inches on top and two feet ten inches at bottom, with a brick lining eight inches thick, separated from the stone walls by an air chamber two inches wide. The lining has no bond with the stone wall except on top, and adds very little to its stiffness.

SPECIFICATION FOR THE TOPOGRAPHICAL SURVEY.

The standard of measure to be used to be the same as the standard at the old arsenal at Central Park. All traverses and measures to be made and returned with such accuracy, that when angles and measures are tested by calculation, no greater variation shall exist than at the rate of fifteen one-hundredths of a foot in one thousand feet of traverse; the surveys and maps to include all buildings and visible boundaries of properties; all streams and brooks; all roads now in use to be shown as in use, and also as legally laid out or dedicated, and all roads and streets laid out on farm plots and dedicated, but not actually opened and in use, are to be shown on the maps.

Levels above high tide are to be taken and shown on the maps, at least every fifty feet in distance, along the centers of all streets and roads now open and in use, and along the course of all streams and brooks, also along the boundary lines of all properties more than three acres in extent each and so frequently between boundary lines; but not more than one hundred feet from each other as will correctly delineate the altitudes of the surface, to allow of contour lines being drawn from such levels.

The standard of high water to be the same as that used for the Commissioners of the Central Park, in the city of New York, north of 155th street.

The map to be drawn on the scale of eighty feet to one inch, on separate sheets of the best English double elephant drawing paper,

well mounted on muslin, with a plain margin, one and a half inches wide, around each sheet, and so that boundary lines on all sheets will conform accurately with other sheets of the survey.

Roads and streets as actually in existence to be shown by fine black lines.

Roads and streets as legally laid out, and opened by law, to be shown by fine, solid red lines.

Roads and streets dedicated, but not in use, to be shown by fine, dotted red lines.

Streams, brooks, ponds, rivers, and elevations above high tide, to be shown by blue lines and figures.

Boundary lines of separate properties to be shown by black, dotted lines.

All traverse lines, angles, and distances measured, to be shown by fine green lines and figures.

Names of present owners of properties to be written on each parcel, in fine black italic letters.

Brick and stone buildings to be designated by red color; framed buildings by a light shade of India ink; green-houses and other structures of glass, by a light green color; prominent rocks and rocky land by India ink topography.

All sheets of maps to be dated and signed by the surveyor, on the margin of the map, when they are returned to the Comptroller of the Park.



